

ANNUAL REPORT ON
RESIDENT FISH ACTIVITIES

FISCAL YEAR 1985

Columbia River Basin
Fish and Wildlife Program
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RESIDENT FISH ANNUAL REPORT - 1985

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INTRODUCTION

This report addresses the status for resident fish projects currently implemented by the Bonneville Power Administration (BPA) under the amended Columbia River Basin Fish and Wildlife Program (Program).

Projects that have been in place for a sufficient length of time are discussed in greater detail with a brief evaluation presented. It is our goal to present more analysis and evaluation of the resident fish projects in future annual reports.

For each of the projects in the Program annual project reviews are presented for BPA and interested parties by the project leaders. The projects are described in detail with results and conclusions presented. At that time BPA project managers evaluate the methods, experimental design and results. Decisions are then made as to the future of the project.

Annual and completion reports are required for the projects and are available from BPA. A list of resident fish reports available is included in this report.

The projects are described here in the same order that the measures, under which they fall, are presented in the Program.

PROJECTS

Program Measures: 804 **(a)(1 - 2)** and (b)(5)

Project: Effects of Operation of Kerr and Hungry Horse Dams on the Reproductive Success of Kokanee in the Flathead System. BPA 81S-5

Contractor: Montana Department of Fish, Wildlife, and Parks

Project Manager: Thomas S. Vogel

Project Status and Approach - The project began in 1981 with the overall purpose of evaluating and documenting the effects of hydroelectric operations at Kerr and Hungry Horse Dams on kokanee reproduction in the Flathead River and shoreline areas of Flathead Lake. This project was begun shortly after the enactment of the Northwest Power Act and prior to the development of the Northwest Power Planning Council's Fish and Wildlife Program. The project is scheduled for completion in late 1987 at which time an evaluation of the effectiveness of measures taken to improve spawning success in the Flathead River will be completed and mitigation alternatives for the Flathead Lake shoreline spawning population will be developed.

The project was designed on the system approach, recognizing that the declining kokanee population in the Flathead System was a result of several problems that exist in the Lake as well as the Flathead River. However, to facilitate data collection and analyses the project was divided into two segments, the Flathead River segment and the Flathead Lake segment. Information from each study segment will be combined to establish system escapement goals that will result in kokanee spawners averaging 300 mm to 330 mm mean length; a size selected by the Montana Department of Fish, Wildlife, and Parks (MDFWP) based on a density dependent relationship that will produce a kokanee fishery balanced between total harvest, catch rates, and average size.

The project is being conducted to meet the following specific objectives:

Flathead River Segment

1. Develop stock recruitment relationship for kokanee in the river system.
2. Quantify the effect of controlled flows on distribution and reproductive success of kokanee in the regulated portion of the Flathead River. Determine the relative contributions of day and nighttime spawning.
3. Determine relative contributions of major river system spawning areas to total kokanee populations.
4. Identify timing and destination of successive runs of kokanee spawners in the Flathead River and their use by fishermen, and determine if migration timing is affected by discharge from Hungry Horse Dam.

Flathead Lake Segment

1. Determine the production potential of Flathead Lake shoreline areas for kokanee salmon.
2. Determine the impacts of the historical and present operation of Kerr and Hungry Horse dams and groundwater storage, velocity and quality and other factors on kokanee reproduction in Flathead Lake.
3. Develop a recovery plan for kokanee shoreline spawning in Flathead Lake.

Kokanee salmon were introduced into Flathead Lake in 1916 and developed both lakeshore and inlet river system spawning populations. A sport fishery developed that included a summer trolling fishery in the lake and an intense fall snag fishery in the river system. MDFWP records indicate kokanee comprised over 80 percent of an estimated annual gamefish harvest of 600,000 in the Flathead system during both 1975 and 1981.

Completion of Hungry Horse Dam in 1953 and its early operation altered natural flow and temperature regimes in the South Fork and in the mainstem Flathead downstream of the South Fork. This condition favored kokanee spawning success and from the late 1950's through mid 1970's strong runs of kokanee reproduced in the river below the South Fork of the Flathead River.

Operations at Hungry Horse changed to provide fall power peaking and coupled with angler harvest resulted in a rapid, 90 percent decline of mainstem kokanee spawning. The operational changes at Hungry Horse Dam resulted in high river flows during the fall kokanee spawning period and lower flows during the winter incubation period. Since kokanee spawn primarily along stream margins and in side channels in the Flathead River, redds were generally constructed by kokanee spawners high on the river banks due to the high river flows. The relatively low flows following spawning led to subsequent dewatering and freezing of incubating kokanee eggs. This heavy incubation mortality along with heavy fishing mortality were likely the major factors in the decline of the mainstem kokanee spawning run.

In Flathead Lake, MDFWP records indicate large numbers of kokanee spawners were using 30 shoreline spawning areas in 1952. In a lake-wide creel census in the mid- 1960's snagging of lakeshore kokanee spawners accounted for 11 to 12 percent of the total kokanee harvest in Flathead Lake. Recent trends in abundance of kokanee lakeshore spawning indicate a significant decline.

The operation of Kerr Dam, located below Flathead Lake on the Flathead River, has altered seasonal fluctuations of Flathead Lake which is thought to be responsible for the decline in lakeshore kokanee spawners. Lake levels presently remain high during kokanee spawning in November and decline during incubation and emergence periods. This drawdown generally limits successful kokanee reproduction in Flathead Lake to a few areas wetted by groundwater seeps and some limited areas below minimum pool.

As a result of findings from this project, as well as information gained from another study on the Flathead River, funded by the Bureau of Reclamation from 1979 to 1981, measures have been identified and implemented to assure recovery of the Flathead System kokanee population. MDFWP has reduced limits and

eliminated snagging of kokanee throughout the drainage in an effort to facilitate restoration of the kokanee population. Mainstem spawning flows of 3,500 - 4,500 cfs (October 15 - December 15) and minimum incubation flows of 3,500 cfs (December 15 - April 15) were recommended. Through cooperative efforts of BPA, the Bureau of Reclamation and MDFWP the recommended flows have been implemented.

At this time recovery of the kokanee population as a result of flow and angler harvest management remains to be documented and will be part of future project efforts. However, egg to fry survival has increased and there are good indications that the population should recover to optimum levels by the late 1990's. Timing of the recovery could vary depending on natural fluctuations in kokanee egg to fry and fry to adult survival rates. Also affecting the recovery rate will be the level of implementation of, yet to be finalized, recommended mitigation measures for lost kokanee spawning habitat in Flathead Lake.

Mitigation measures developed for Flathead Lake are expected, by BPA, to be implemented by the Montana Power Company who operate Kerr Dam. The direction for implementation of mitigation measures is expected to come from the Federal Energy Regulatory Commission (FERC). This expectation is based on BPA policy in accordance with the Northwest Power Act that it protect, mitigate, and enhance fish and wildlife adversely affected by development and operation of Columbia River Federal hydroelectric facilities and not those facilities operated by non-Federal entities through the licensing authority of FERC.

One other potential problem that may adversely impact the recovery rate of the Flathead kokanee population has recently been identified as a result of this study. The problem is associated with recent indications that the Mysis shrimp population in Flathead Lake is expanding at a relatively rapid rate. Some of the recent data collected on zooplankton populations remains to be analyzed, but if the data demonstrates Mysis is expanding, consideration will be given to expand the project's zooplankton investigations. The rationale for concern over an expanding Mysis shrimp population is the fact that in many Lake systems the Mysis competes for food with young kokanee leading to low survival of fry to adult kokanee. By observing changes in the lake's zooplankton population as related to increased numbers of Mysis shrimp one might be able to predict the impact on recovery of the kokanee population. If it is found that the recovery will not occur through natural production as a result of Mysis shrimp, it would be better to look at other alternatives, such as a kokanee hatchery, rather than forego revenues as a result of operational constraints on Hungry Horse Dam to protect kokanee spawning and incubation in the mainstem Flathead River.

Program Measures: 804(a)(3) and 804(b)(6).

Project: Lower Flathead System Fisheries Study. BPA 83-1.

Contractor: Salish-Kootenai Tribes.

Project Manager: Tom Vogel.

Project Status and Approach - Development of this project began shortly after passage of the Northwest Power Act and prior to development of the Columbia River Basin Fish and Wildlife Program. The project began in December of 1982. The purpose of the study is to evaluate the impacts of Kerr Dam upon the fisheries resources of the lower Flathead System. From the data collected during the project, an array of management/mitigation alternatives will be developed covering the present status of hydroelectric development and operation. The objectives of the study are:

1. Assess existing aquatic habitat in the Lower Flathead River and its tributaries and its relationship to the present size, distribution, and maintenance of all salmonid species, northern pike, and largemouth bass populations.
2. Assess how and to what extent hydroelectric development and operation affects the quality and quantity of aquatic habitat in the lower Flathead River and its tributaries and life stages of existing trout, pike, and largemouth bass populations. Evaluate the potential for increasing quality habitat and thus food and game fish production, through mitigation.
3. Assess existing aquatic habitat in the South Bay of Flathead Lake and its relationship to the present size, distribution, and maintenance of yellow perch, largemouth bass, northern pike, mountain whitefish, and lake whitefish populations in the bay.
4. Assess how and to what extent hydroelectric development and operation affects the quality and quantity of aquatic habitat in South Bay and life stages of existing target fish populations.
5. Develop an array of fisheries management options to mitigate the impacts of present hydroelectric operations, demonstrating under each management option how fish populations and hydroelectric generation capabilities would be modified.

During the first two field seasons of the study the Salish-Kootenai Tribes have documented the impact of Kerr's present operational regime upon the success of

trout and northern pike spawning and recruitment. Presently the hydroelectric operational regime involves rapid changes in river discharge during spawning and incubation periods. This operating regime causes water velocity and depth to constantly vary over spawning gravels. Kedds are dewatered, and eggs and fry are stranded. Constant water level fluctuations over backwater vegetation has been identified as creating major problems in successful northern pike spawning and recruitment, by preventing access to spawning sites and dewatering eggs.

Project personnel have confirmed two tributaries as major spawning sites for river trout. The predominance of 1+ and 2+ rainbow and brown trout in the lower reaches of the tributaries may reflect the utilization of the tributaries by main river stocks.

Initial work on Flathead Lake was completed in FY 1984 and included the mapping of habitat types throughout South Bay and the evaluation of physical habitat using SCUBA techniques. Permanent habitat transects, water quality stations; and sites for sampling fish with gillnets, seines, and traps were established, as were the techniques for handling and processing data.

Monitoring of fish populations and how they are affected by Kerr operations will continue and management/mitigation alternatives will be developed. Instream flow evaluations were initiated during 1985 and will be continued in 1986 to evaluate the impact of various flow regimes on fish and hydroelectric power production. Data on the spatial and temporal distribution of target fish species in South Bay will be correlated with identified habitat types and changing lake levels. This project will be completed December 30, 1987. At that time an array of management/mitigation alternatives for the lower Flathead system will be proposed.

This project was designed to address impacts of hydroelectric development and operation of Hungry Horse and Kerr Dams on the Lower Flathead System. Study results indicate that major adverse impacts on the fishery resources in the South Bay of Flathead Lake and the Lower Flathead River are a result of Kerr Dam operation. Additional degradation of fish habitat is due to irrigation development on tributary streams to the Lower River.

Because impacts to the fish resources of the Lower Flathead System are generally not the result of Federal hydroelectric development and operation, but rather non-Federal hydroelectric operations and irrigation development, BPA does not plan further involvement in the Lower Flathead System once this project is completed. Management alternatives will be left to the Tribes and the MDFWP to implement. Implementation of mitigation alternatives will be left to the Montana Power Company.

Program Measure: 804(a)(9).

Project: Determination of Instream Flow Needs and Fish Populations in Selected Kootenai River Drainage Tributaries. BPA 85-6.

Contractor: Montana Department of Fish, Wildlife, and Parks.

Project Manager: Fred Holm.

Project Status and Approach - The Kootenai River below Libby Dam supports one of western Montana's most popular trout fisheries. A dense population of wild rainbow trout inhabits the 50 miles of river between Libby Dam and the Idaho border. Although a small population of native rainbow resides in Callahan Creek (near Troy, Montana), most of the Kootenai's rainbows are migratory fish that are derived from hatchery stocks. The migratory fish reside in the Kootenai River but spawn in tributary streams. May et al. (1983) recognized the critical importance of tributary streams to the Kootenai fishery and listed reservation of instream flows in tributaries as a top management priority.

Determination of instream flows needed to ensure successful migration, spawning and rearing of rainbow and cutthroat trout in Kootenai drainage tributaries is especially important at the present time. FERC applications for micro-hydro development are pending on ten tributaries of Lake Koocanusa and two tributaries of the Kootenai River. Irrigation diversions exist on at least two streams, including Graves Creek, a major spawning tributary of Lake Koocanusa that is also targeted for a micro-hydro development. It is important that instream flows in important tributaries be determined so that fisheries' needs can be balanced with power and irrigation.

This study will determine instream flows required to ensure successful migration, spawning and rearing of rainbow and cutthroat trout in five tributaries of the Kootenai River and six tributaries of Lake Koocanusa. The study objectives are:

1. Determine instream flows needed to ensure successful migration, spawning and rearing in the following tributaries of the Kootenai River and Lake Koocanusa: Callahan, Quartz, Libby and O'Brien creeks, and the Fisher River (Kootenai River) and Graves, Deep, Big, Bristow, Barron and Five-Mile creeks (Lake Koocanusa).
2. Estimate fish populations or relative abundance in stream reaches where instream flow determinations are made.

Since the project has only been in place one month, there is nothing substantive to report at this time. The study was started on August 20, 1985 and will continue through September 30, 1986, with FY-85 funds, at which time a final report will be submitted.

804. MEASURES - (b) DRAWDOWN REQUIREMENTS

Program Measure: 804(b)(3).

Project: Quantification of Libby Reservoir Levels Needed to Maintain or Enhance Reservoir Fisheries. BPA 83-467.

Contractor: Montana Department of Fish, Wildlife and Parks.

Project Manager: Stephen Smith.

Project Status and Approach - Libby Dam was constructed on the Kootenai River as part of the Columbia River Treaty between the United States and Canada to provide hydroelectric power and flood protection for the Kootenai and Columbia River basins (Columbia River Treaty 1961). Construction began in 1966, impoundment was first achieved in March 1972, and a full pool elevation of 2,459 feet was first reached in July 1974.

Project 83-467 was initiated in May 1983 to determine how operations of Libby Dam impact the Libby Reservoir fishery and suggest alternatives to lessen those impacts. The first year of the study was spent testing and selecting methods for collecting data and using these data to design a sampling strategy. Study objectives were finalized to include:

1. Quantify available reservoir habitat.
2. Determine the abundance, growth, and distribution of fish within the reservoir.
3. Determine the abundance and availability of food organisms for fish in the reservoir and quantify fish use of available food items.
4. Develop relationships between reservoir drawdown and reservoir habitat for fish and fish food organisms.
5. Estimate impacts of reservoir operation on the reservoir fishery.

Data collection will continue in 1986. The overall goal of this study is to provide information describing impacts of various reservoir operational regimes on the reservoir fishery. To that end a predictive model will be developed which will allow decision makers to understand trade-offs and opportunities provided by different reservoir operation regimes. The study is scheduled to be completed by November 15, 1987.

Program Measure: 804(b)(3).

Project: Quantification of Hungry Horse Reservoir Levels Needed To Maintain Or Enhance Reservoir Fisheries. BPA 83-465.

Contractor: Montana Department of Fish, Wildlife, and Parks.

Project Manager: Stephen Smith.

Project Status and Approach - Hungry Horse Dam was completed in 1952 and the reservoir reached full pool elevation of 3,560 feet msl in July 1953. The dam impounded the South Fork of the Flathead River five miles upstream from its confluence with the Flathead River. Hungry Horse is a large storage reservoir whose primary benefits are flood control and power production. This study, initiated in 1983, proposes to quantify seasonal water levels needed to maintain or enhance principal gamefish species in Hungry Horse Reservoir. The first three years of the study are concerned primarily with collecting and analyzing data about the effects of drawdown on fish food availability and game fish abundance and distribution. Specific objectives for the study are listed below.

1. Determine the quality and quantity of spawning and rearing habitat for westslope cutthroat in tributaries to Hungry Horse Reservoir and identify barriers which block or delay spawning runs.
2. Assess emigration of westslope cutthroat trout juveniles from tributary streams.
3. Quantify the amount of reservoir habitat available at different water level elevations.
4. Determine the abundance, growth, distribution and use of available habitat by major game fish species in the reservoir.
5. Determine the abundance and availability of fish food organisms in the reservoir and quantify the seasonal use of available food items by major fish species.
6. Develop relationships between reservoir drawdown and reservoir habitat used by fish and fish food organisms and estimate the impact of reservoir operation on major game fish species.

Data collection for these six objectives will continue in 1986. The overall goal of this study is to provide decisionmakers with information describing impacts of various reservoir operational regimes on the reservoir fishery. To

that end a predictive model will be developed which will allow decisionmakers to understand trade-offs and opportunities provided by different reservoir operation regimes.

The study is scheduled to be completed by November 15, 1987.

Program Measure: 804(b)(4).

Project: Determination of the Fishery Losses in the South Fork of the Flathead River and Tributaries Resulting from the Filling of Hungry Horse Reservoir. BPA 85-23.

Contractor: Montana Department of Fish, Wildlife, and Parks.

Project Manager: Fred Holm.

Project Status and Approach - Construction of Hungry Horse Dam in 1952 flooded over 35 miles of the South Fork Flathead River and varying amounts of approximately 50 tributary streams. Isolation of migratory fish in the South Fork drainage from Flathead Lake was not mitigated by the creation of new lake habitat in Hungry Horse Reservoir. The reservoir simply captured fish destined for Flathead Lake, producing no more recruitment to the system. Spawning and juvenile trout rearing habitat in the flooded portions of the river and its tributaries were lost without replacement. The amount of trout habitat lost has not been quantified.

Section 804(b)(4) of the Columbia River Basin Fish and Wildlife Program calls for construction, operation and maintenance of a spawning channel along the Flathead River as mitigation for habitat loss in the South Fork and Flathead Rivers. The measure also calls for a study to determine levels of production necessary to mitigate the effects of the hydroelectric system.

Project 85-23 will estimate fishery losses in the South Fork of the Flathead River and its tributaries as a result of filling Hungry Horse Reservoir. The objectives of the study are:

1. Determine, to the extent possible, the quantity and quality of stream trout habitat lost as a result of construction of Hungry Horse Dam.

2. Estimate the density (standing crop) of fish that inhabited the flooded portions of Hungry Horse tributaries and the South Fork of the Flathead River prior to impoundment.
3. Assess the desirability and cost-effectiveness of alternative measures to mitigate these losses.

The study, having started August 1, 1985, is just underway with nothing substantive to report as yet. It will conclude on July 31, 1986. The project will include background and literature research, fish habitat modeling and field verifications. The project results will be correlated with those of Project 81S-5 to determine if fishery losses can be mitigated with operational changes at Hungry Horse Dam or if a spawning channel is also needed.

804. MEASURES - (e) ADDITIONAL RESTORATION MEASURES

Program Measure: 804 (e)(1) and (2).

Project: Evaluation of Management of Water Releases from Painted Rocks Reservoir, Bitterroot River, Montana. BPA 83-463.

Contractor: Montana Department of Fish, Wildlife, and Parks.

Project Manager: Fred Holm.

Project Status and Approach - Measure 804 (e)(1) of the amended Columbia River Basin Fish and Wildlife Program (Program) specifies the purchase of 10,000 acre-feet of water from Painted Rocks Reservoir to maintain summer and fall flows in the Bitterroot River for resident fish. The 10,000 acre feet is in addition to the 3,200 acre-feet base flow and the 5,000 acre-feet already purchased in perpetuity by the Montana Department of Fish, Wildlife, and Parks, Western Mountain Fish and Game Association, and Ravalli County Fish and Wildlife Association.

The status of the water purchase is this: Montana Department of Fish, Wildlife, and Parks has included the purchase of the additional 10,000 acre feet in their budget for 1985 and 1986. At the same time, they have petitioned the FERC to delay Montana Power Companies license revision for the Thompson Falls hydro project on the Clark Fork. Their intervention is designed to have the FERC order Montana Power to purchase the 10,000 acre-feet from Painted Rocks in perpetuity as mitigation for Thompson Falls.

The present study (BPA Project 83-463) addressing program measure 804 (e)(2) includes:

1. development of an implementable water management plan for supplemental releases from Painted Rocks Reservoir which would provide optimum benefits to the river;
2. gathering fisheries and habitat information to evaluate the effects of dewatering in the river;
3. collection of baseline information that will aid in determining the effectiveness of supplemental water releases in improving the fisheries resource.

The study was initiated in July, 1983, and will run until the spring of 1987 when a final report and water management plan are due. Throughout the study and particularly this year the water releases have seldom resulted in the desired flows, 375 cfs, being maintained in the area of concern. Irrigation diversions are mainly responsible for lack of water in the critical area, but natural losses occur also. This year, for the first time, a water commissioner was appointed to oversee the water usage on the river in an attempt to insure sufficient fish flows in the lower river. The results to date are inconclusive. An analysis will be made in this year's annual project report.

BPA will fund the evaluation of the water releases one more season. At that point a determination regarding the water purchase must be made.

Realistically, if the water releases do not maintain adequate fish flows in the critically dewatered areas, a permanent water purchase can not be justified from an economic or biological standpoint.

Program Measure: 804 (e)(3) and (8).

Project: White Sturgeon Early Life History Requirements and Genetics Study.
BPA 83-316.

Contractor: School of Fisheries, University of Washington

Project Manager: Fred Holm.

Project Status and Approach - This study is directed toward the examination and definition of the early life history characteristics of Columbia River white sturgeon.

The distribution behavior of larvae, fry, and subadults is being examined with very sophisticated laboratory techniques at the University of Washington School of Fisheries.

Understanding this behavior may show the influence of hydroelectric development on isolation of Columbia River white sturgeon populations.

A genetic assessment of Columbia River white sturgeon populations is being done through the electrophoretic technique. This will determine what distinct populations, if any, must be considered if artificial propagation and stock supplementation are selected as a mitigation and enhancement technique for rebuilding the upriver white sturgeon populations.

The annual review for this project was presented to a peer group of sturgeon researchers at the BPA funded sturgeon workshop in June of this year. The consensus of the group is that the project should continue with the following tasks being stressed:

1. Extend research on distribution of larvae in response to current at hatching and post yolk absorption behavior of newly feeding fry to evaluate the limitations of their dispersal mechanism. The high fecundity of sturgeon indicates that mortality of spawn is also high. Determining the source of variability in survival success from year to year in response to environmental conditions, will provide background on how to most effectively enhance sturgeon.
2. Examine the salinity tolerance of larvae and fry when exposed to estuarine salinities, and determine when fry can withstand full strength seawater. The extent of limitation imposed by hydroelectric developments on distribution of sturgeon is unknown. Habitat reduction in the Columbia may be compensated for below Bonneville by exploiting the marine area.
3. Extend the work on substrate preference. Reduced gravel recruitment and increased deposit of fines resulting from dam construction will continue to change substrate composition in the Columbia River. Impact of this change will be determined by examining the behavior of juveniles on different substrates and the food supplies they exploit on those substrates.
4. Research the effect of water quality variables such as dissolved oxygen, gas supersaturation, and temperature on development and survival of sturgeon. Many changes have occurred in the water quality from hydroelectric developments on the river. The sensitivity of sturgeon to changes in water quality implies that a negative impact will be experienced by young fish rearing in the river at certain times of the year.
5. Continue and expand the genetic assessment of the white sturgeon populations throughout the Columbia River Basin.

Program Measure: 804 (e)(3) and (8).

Project: White Sturgeon Research Program Development. BPA 85-64.

Contractor: Battelle Pacific Northwest Laboratories.

Project Manager: Fred Holm.

Project Status and Approach - One of the fish species most directly impacted by the development and operation of the hydroelectric power system is the white sturgeon. Little is known of the effects of these impacts. In fact, knowledge of the life history of the species is itself limited. Because of this the Council put Measures 804 (e) (3) and (8) into the Program.

A work group, representing the fisheries agencies, Tribes, Universities, and the private sector involved in research, management or rearing of white sturgeon in the region, participated in two BPA funded work shop sessions in 1983 and 1985. A work plan for white sturgeon research needs was developed from the workshops.

BPA will begin funding projects for the two top priority needs, identified in the work plan, in FY-1986. These are sturgeon habitat assessment and sturgeon stock assessment.

Another objective of this project is to set up a process to enhance communication among researchers and managers of the white sturgeon resource to avoid duplication of effort and facilitate information exchange. This will include the maintenance of an updated bibliography on white sturgeon, possibly through the computer system of the Pacific Northwest Laboratories.

Program Measure: 804 (e)(5).

Project: Construct Cabinet Gorge Hatchery. BPA 84-19.

Contractor: Idaho Department of Fish and Game.

Project Manager: Tom Clune.

Project Status and Approach - The Bonneville Power Administration (BPA), the Washington Water Power Company (WPPC), and Idaho Department of Fish and Game (IDFG), entered into a three-party agreement in 1984 to construct a hatchery that will annually produce 20 million kokanee fry to enhance the kokanee

stocks in Lake Pend Oreille. The kokanee stocks have declined due to the decrease in shoreline spawning habitat, associated with fluctuating water levels from Cabinet Gorge and Albeni Falls Dams, and the introduction of Mysis shrimp which have depleted the availability of plankton, the primary food source of young kokanee. The Cabinet Gorge Hatchery facility will enable the IDFG to rear the young kokanee to a size large enough to compete with the Mysis for the plankton resource. BPA and WWPC are sharing the costs of constructing the facility, and IDFG will fund the operation and maintenance. The three-party cost sharing approach was developed to share the mitigation responsibilities of the three entities and, for BPA, ensure the best investment of ratepayer funds for the intended mitigation purpose.

The construction is ongoing with the completion scheduled for November 1985. It will probably take several years for the hatchery to reach the 20 million kokanee annual production because of the inadequate number of spawners currently returning to the trapping facilities in tributaries to the lake. The production will be increased as rapidly as possible toward the 20 million goal.

A bioengineering evaluation is presently being developed by BPA and IDFG to determine the biological efficiency of the hatchery production and to fine-tune the physical facility, if needed. The bioengineering evaluation will begin about December 1, 1985, or upon completion of construction.

Program Measure: 804 (e)(5).

Project: Kokanee Stock Status and Evaluation of the Cabinet Gorge Hatchery.
BPA 85-339.

Contractor: Idaho Department of Fish and Game.

Project Manager: Fred Holm.

Project Status and Approach - This study has been funded for Idaho Department of Fish and Game and is designed to evaluate the contribution of Cabinet Gorge Hatchery to the Lake Pend Oreille fishery. The project, started in April 1985, has the following six objectives:

1. To assess the status of kokanee in Lake Pend Oreille before the influence of Cabinet Gorge Hatchery, including population size estimation, age composition and hatchery-wild composition.
2. To determine kokanee age composition, growth and survival rates in relation to population density and carrying capacity of Lake Pend Oreille.

3. To evaluate size, timing and locations for release of hatchery-reared kokanee.
4. To obtain index information on natural spawning kokanee.
5. To monitor Lake Pend Oreille zooplankton types and abundance and relate to changes in the size of the kokanee population.
6. To obtain pre-hatchery Lake Pend Oreille fishery harvest data to provide a basis for comparison with similar data after the hatchery production influences the fishery.

Objectives 1, 5, and 6 are being addressed at present with the others scheduled to be addressed soon. An extensive harvest data collection project was done the past summer, to be followed up by another in 1989 when kokanee from the Cabinet Gorge Hatchery enter the fishery. The project is progressing smoothly. It will be funded for the period required to meet the above objectives.

Program Measure: 804 (e)(15).

Project: Colville Hatchery. BPA 85-38.

Contractor: Colville Confederated Tribes.

Project Manager: Fred Holm.

Project Status and Approach - A technical work group representing the fisheries agencies, Tribes, the Northwest Power Planning Council (NPPC), the Pacific Northwest Utilities Conference Committee (PNUCC), the U.S. Army Corps of Engineers (COE), and the Bonneville Power Administration (BPA), has been formed to provide input to the hatchery design and construction process.

The technical work group concept has worked so successfully in the Yakima River Basin program that it is being used on the Colville Hatchery project and is working well here, also.

The hatchery will be designed to rear 50,000 pounds of trout annually for stocking the lakes and streams on the Colville Indian Reservation.

Two potential hatchery sites have been identified by the work group. One is just downstream from Chief Joseph Dam on the right bank of the Columbia River. It would use water from the relief tunnel at the dam for a water supply. The other site is about three miles farther downstream, also on the right bank of the Columbia, at an old gravel pit site - known as "the Big Hole." Groundwater would be the water supply at this site.

To obtain the best value for the rate payers of the region BPA has contracted with an engineering firm to evaluate the water supplies of the two sites. The evaluation will include costs to supply water to the respective sites, pumping costs and operation and maintenance over the life of the project. **This** information will be used in the final site selection.

An intergovernmental agreement has been negotiated with the Colville Confederated Tribes to conduct the preliminary design phase for the hatchery. The preliminary design effort will determine the most feasible site and establish a construction budget for subsequent funding of design, construction and operation of the proposed hatchery. Five engineering firms have submitted proposals for the preliminary design phase. One will be selected in October to conduct this.

The final design will be done in FY-1986 with construction scheduled for FY-1987 and FY-1988. Upon completion BPA will fund the operation and maintenance of the facility.

RESIDENT FISH PROGRAM SUMMARY

In the Northwest Power Act the major emphasis is placed on the protection, mitigation, and enhancement of the anadromous fisheries resources in the Columbia River Basin. Because of this the resident fish program is smaller in scope, but continues to grow along with the entire Fish and Wildlife Program.

Implementation of additional resident fish projects is dependent on a number of factors.

The ongoing projects discussed above will give BPA direction for the protection, mitigation, and enhancement of resident fish in the project areas. This will lead to other projects being implemented.

Amendments currently being submitted for inclusion in the Columbia River Basin Fish and Wildlife Program (Program) may be added to Section 800 (Resident Fish) for project implementation. No resident fish goals have been set for the Columbia River Basin. Instead, amendment applications submitted to the Council are reviewed on a project- by-project basis. Funding is recommended if the following criteria are met:

1. documentation of or agreement on resident fish losses attributable to the hydroelectric facility at issue.
2. evidence that significant biological gains will be achieved by the expenditure.
3. evidence that the project will result in no significant conflict with efforts to restore anadromous fish.

The Program 201 goals, when established, may indicate that there are areas in the Basin where anadromous fish once were produced, but because of hydropower development or operations can no longer be produced. In these areas resident fish may be substituted or enhanced. The Council has appointed a resident fish substitution advisory committee who is making recommendations for such substitutions. This could possibly lead to an expansion in the resident fish program in the Columbia River Basin.

RESIDENT FISH REPORTS

RESIDENT FISH

(DOE/BP-2021 Lower Flathead [Montana] Fisheries Study (83-1),
Annual Report: 1983

(DOE/BP-362) Lower Flathead [Montana] Fisheries Study (83-1),
Annual Report: 1984

(DOE/BP-2251 Cumulative Impact Study of Microhydro Sites (82-19), Swan River
[Montana], Annual Report: 1983

(DOE/BP-200) Effects of Operation of Kerr and Hungry Horse Dam on the
Reproductive Success of Kokanee in the Flathead System (81S-5), Annual
Report: 1983

(DOE/BP-204) Impacts of Water Level Fluctuations on Kokanee Reproduction in
Flathead Lake (81S-5), Annual Report: 1983

(DOE/BP-201) White Sturgeon Research Needs: Workshop Results, 1983

(DOE/BP-363) Columbia River White Sturgeon Enhancement (83-316), Final
Report: 1984

(DOE/BP-296) Quantification of Libby Reservoir Levels Needed to Maintain or
Enhance Reservoir Fisheries (83-467), Annual Report: 1983

(DOE/BP-312) Quantification of Hungry Horse Reservoir Levels Needed to
Maintain or Enhance Reservoir Fisheries (83-465), Annual Report: 1983

(DOE/BP-13076) Evaluation of Management of Water Release for Painted Rocks
Reservoir, Bitterroot River, Montana (83-463), Annual Report: 1984

(DOE/BP-12660-1) Quantification of Libby Reservoir Levels Needed to Maintain
or Enhance Reservoir Fisheries (83-467), Annual Report: 1984

(DOE/BP-12660-1A) Quantification of Libby Reservoir Levels Needed to Maintain
or Enhance Reservoir Fisheries (83-467), Annual Report 1984 Appendix

(DOE/BP-12659-1) Quantification of Hungry Horse Reservoir Levels Needed to
Maintain or Enhance Reservoir Fisheries (83-465), Annual Report: 1984

(DOE/BP-383) Effects of Operation of Kerr and Hungry Horse Dam on the
Reproductive Success of Kokanee in the Flathead System (815-5), Annual
Report: 1984

(DOE-BP-36717-1) Cumulative Effects of Micro-Hydro Development on the Fisheries of the Swan River Drainage, Montana (82-19); Volume I: Summary Report, Final Report: 1984

(DOE/BP-36717-2) Cumulative Effects of Micro-Hydro Development on the Fisheries of the Swan River Drainage, Montana (82-19); Volume II: Final Report: 1984

(DOE/BP-36717-3) Cumulative Effects of Micro-Hydro Development on the Fisheries of the Swan River Drainage, Montana (82-19); Volume III: Fish and Habitat Inventory, Final Report: 1984

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